# DEENDAYAL PORT AUTHORITY

**(Erstwhile 'Kandla Port Trust')**

**Chief Mechanical Engineer**
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**Date - 20.05.2025**

**To,**

**----------**
**----------**

**Subject: Port Integrated Bio-Methanol Production Plant at Deendayal Port Authority, Kandla - reg.**

**Sir,**

**Deendayal Port Authority intends to commission Port Integrated Bio-Methanol Production Plant at Deendayal Port Authority, New Kandla with Operation and Comprehensive maintenance and feedstock supply.**

**Kindly submit your Expression of interest, with Sign. and Seal (as token of acceptance) on Terms & Conditions and filled-in Annexure (Credentials & Budgetary Offer).**

**Last date of submission of your Expression of interest along with budgetary offer in this office for the above work is up to 02.06.2025.**

**Thanking you,**

**Yours faithfully,**

***-sd-***
**Chief Mechanical Engineer**
**Deendayal Port Authority**

# Terms & Conditions

**Deendayal Port Authority invites proposal(s) from prominent firms for undertaking the lump sum turnkey implementation and commissioning of complete scope for the Biomass Gasification, Syngas Cleaning, and Methanol Production Plant at Deendayal Port Authority, New Kandla. The scope also includes comprehensive operations & maintenance, and supply of fuel for the continuous operations of the proposed plant.**

**This innovative project aligns with the vision of fostering sustainable energy solutions and represents a significant step towards achieving a low-carbon future. This will make DPA future ready, setting benchmark for sustainable maritime transportation. Key outcomes of the proposed project includes:**

- **DPA to become India's first port integrated bio-methanol producer,**
- **Over 15,000 MTPA bio-methanol output (Compliant with FuelEU Maritime Regulation),**
- **Huge direct and indirect employment generation.**

**DPA intends to collaborate with firm having extensive expertise and capabilities in executing complex projects involving advanced clean energy technologies and shall hold valid license of BARC for Incinerator and torch. The firm shall understand the critical importance of this project in Deendayal Port Authority, & Kandla's portfolio and shall commit to deliver a state-of-the-art facility that ensures efficiency, sustainability, and scalability, with leveraging multidisciplinary expertise, robust project management framework, and a strong commitment to innovation.**

**Methanol**

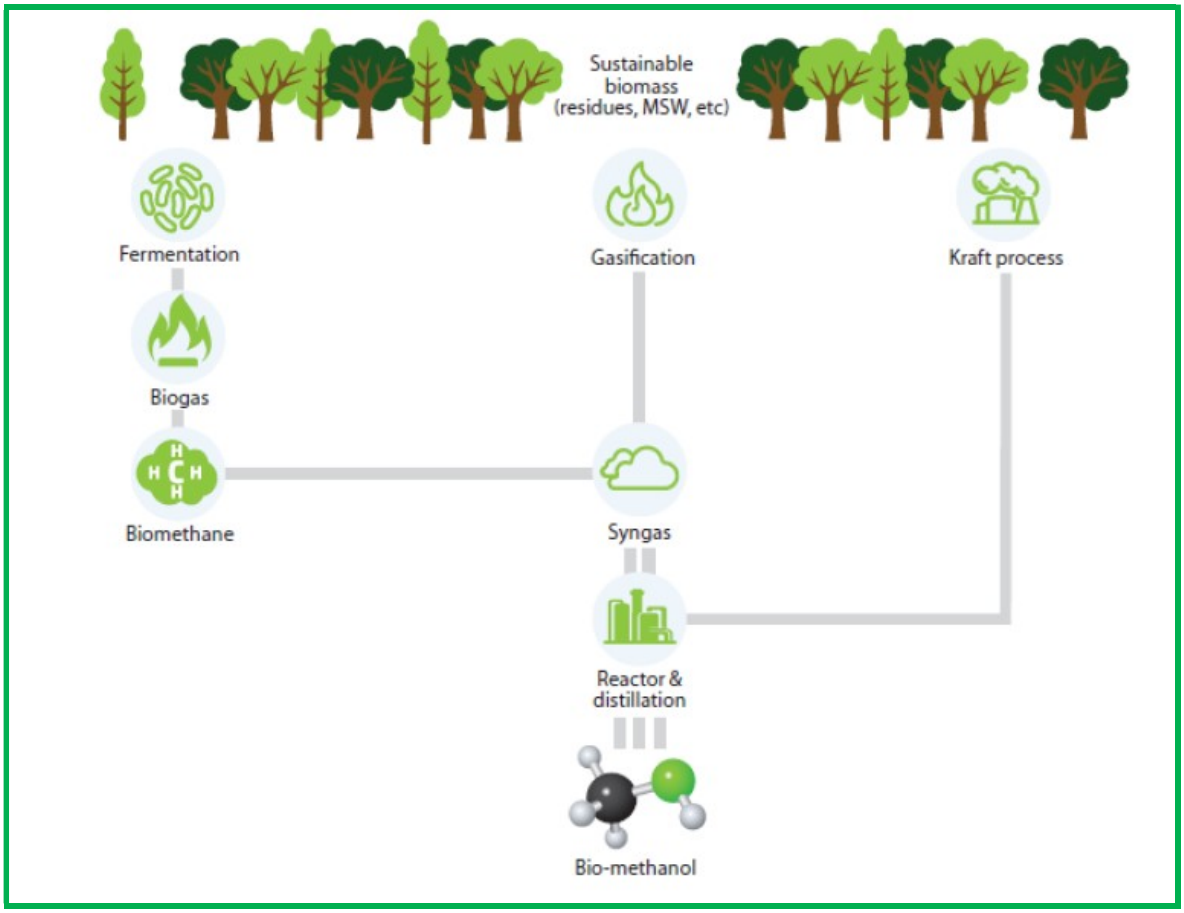
**Methanol ($CH_3OH$) is a crucial chemical commodity used in a variety of industries, including chemicals, fuels, and energy. It is a colorless, biodegradable liquid that serves as a key building block for a wide range of industrial applications. Methanol is used in several key industries, with global consumption exceeding 100 million metric tons per year across various applications:**

- **Plastics (Polyethylene, Polypropylene, PET bottles, etc.) - Methanol is used in producing formaldehyde, acetic acid, and olefins, which are essential in manufacturing plastics.**
- **Paints and Coatings - Methanol is a precursor for resins and solvents used in adhesives and glues - formaldehyde-based resins derived from methanol are used in furniture, woodworking, and packaging adhesives.**
- **Downstream chemicals – Methanol is involved in producing surfactants and solvents used in liquid detergents and household cleaners, used in fragrances, hair sprays, and nail polish removers, household and industrial paints, in furniture and construction materials, insulation boards and composite materials, PVC pipes and flooring materials, in textile dyeing and finishing processes, solvent and reactant in drug synthesis, IV bags, syringes, and medical tubing, agrochemicals for crop protection.**
- **Marine and Automotive Fuels: Methanol is gaining popularity as a cleaner alternative fuel for ships and heavy-duty vehicles, significantly reducing sulphur emissions and particulate matter.**
- **Hydrogen Carrier: Methanol can be reformed into hydrogen for use in fuel cells, providing an easier way to store and transport hydrogen compared to compressed gas or liquefied hydrogen**

**Methanol is a strategic commodity in the global economy due to its versatility as a fuel and chemical feedstock, supporting industries like automotive, construction, and energy. Its role in reducing carbon emissions and facilitating the transition to sustainable energy sources enhances its importance.**

**<u>Bio-Methanol</u>**

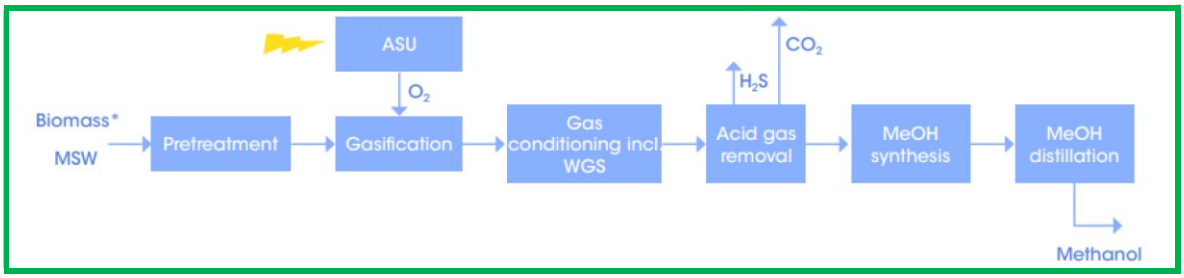
**Bio-methanol refers to methanol produced from renewable sources such as agricultural residues, forestry waste, organic fractions of municipal solid waste (MSW), and refuse-derived fuel (RDF). It is generated through thermochemical processes like gasification or anaerobic digestion, where biomass and waste materials are converted into syngas and subsequently synthesized into methanol. Bio-methanol significantly reduces greenhouse gas emissions compared to fossil-based methanol and supports a circular economy by utilizing waste materials for energy production.**




***Bio-methanol production pathways***

**Biomass-to-Methanol Process**

**The process involves the thermochemical conversion of biomass materials into methanol through the following key steps:**




*Process flow diagram for Waste / biomass to methanol*

- **Feedstock Preparation: Collection and preprocessing of waste, including segregation, drying, and size reduction.**
- **Gasification: High-temperature gasification (biomass and RDF) to produce synthesis gas (syngas), a mixture of CO, H2, and CO2.**
- **Gas Cleaning and Conditioning: Removal of impurities such as sulfur, particulates, and tar to ensure a clean syngas feed for methanol synthesis.**
- **Methanol Synthesis: Syngas undergoes catalytic conversion using copper-based catalysts to produce methanol.**
- **Methanol Purification: Distillation and separation of methanol to achieve fuel-grade purity.**

**Project Outline**

**Detailed project outline for the proposed bio-methanol production at Kandla, Gujarat, designed to align with EU RED II directives and national regulations.**

**Project Objective: To establish India's first, port-integrated bio-methanol production facility focused on the conversion of biomass and agricultural residues into sustainable marine fuel. The output will be compliant with EU Directive 2018/2001 (RED II), targeting both domestic and export maritime fuel markets.**

**Utilities & Infrastructure Requirements:**

- **Land Development: Industrial grading, bunding for flood protection, internal roads.**
- **Water Supply Infrastructure: Supply of fresh or desalination/RO plant for sea water.**
- **Power Backup: Diesel generators or battery energy storage systems (BESS).**
- **Fire & Safety: NFPA-compliant fire protection system, methanol-safe handling equipment.**
- **Environmental Controls: Gas scrubbers, flare system, online emissions monitoring.**
- **Methanol Bunkering: large scale methanol transfer, storage, bunkering and filling infrastructure.**

**Regulatory Compliance Requirements:**
**The project falls within a coastal industrial zone in Gujarat, and the following statutory and environmental clearances will be applicable:**

| Regulatory Aspect | Applicable Requirement / Authority |
|---|---|
| Environmental Clearance (EC) | Ministry of Environment, Forest and Climate Change (MoEFCC), SEIAA Gujarat |
| Coastal Regulation Zone | Gujarat Coastal Zone Management Authority (GCZMA) |

| | |
|---|---|
| (CRZ) Clearance | |
| Consent to Establish / Operate | Gujarat Pollution Control Board (GPCB) – under Air & Water Acts |
| Hazardous Waste Authorization | GPCB – for storage and handling of methanol and process residues |
| Explosive & Petroleum Act Compliance | PESO (Petroleum and Explosives Safety Organisation) |
| Factory License & Labour Laws | Directorate of Industrial Safety and Health, Gujarat |
| Power Connection / Captive Generation | Gujarat Energy Transmission Corp. (GETCO) / GUVNL |
| Water Withdrawal / Use Permissions | Gujarat Water Supply and Sewerage Board (GWSSB), Port Authority |
| Construction Permits & Fire NOC | Local Port Planning Authority, & Fire Department |
| EU RED II Certification (for exports) | Voluntary sustainability scheme approved by EU (e.g., ISCC, RSB) |
| Customs & Export Licensing (if required) | Directorate General of Foreign Trade (DGFT), APEDA (if exporting) |

Strategic Fit

The project will support DPA's broader commitment to clean energy and green shipping under:

- The National Green Hydrogen Mission (methanol as a derivative of green $H_2$)
- Gujarat's Renewable Energy Policy
- IMO's GHG strategy for shipping
- EU RED II compliance for exports

The successful contractor shall ensure that all systems, subsystems, and equipment within the Bio-Methanol Production Facility undergo rigorous Functionality Testing and Performance Validation prior to the Commercial Operation Date (COD). This will guarantee that the plant operates in compliance with the designed output, safety, and environmental standards.

| System / Area | Functionality Requirements | Verification Method / Benchmark | Remarks / Damages Clause |
|---|---|---|---|
| Feedstock Handling & Pre-processing | Handle up to a minimum of 3.3 TPD of biomass input; uninterrupted operation | 72-hour continuous operation test | Any failure to sustain throughput will result in rectification at Contractor's cost |
| Biomass Gasification Unit | Continuous gasification with acceptable syngas quality (CO, $H_2$, $CH_4$), details of syngas composition to be finalised after the engineering acceptance by DPA Kandla. | Syngas composition verified via gas chromatography at an acceptable point(s) in the process | Non-compliance will delay COD and attract liquidated damages |
| Syngas Conditioning & | Clean syngas to meet synthesis standards; | Yield test; Methanol purity test; 72-hour | Shortfall in purity or output will attract |

| | | | |
|---|---|---|---|
| Methanol Synthesis | methanol purity ≥ 99.5%; Minimum 1.8 TPH output | stable production | liquidated damages |
| Bio-Methanol Storage System | Leak-proof tanks (up to 25,000 KL), vapour recovery systems | Hydro-testing; Vapour containment system audit | Mandatory for final acceptance |
| Power & Utility Systems | Maximum power consumption: 3.5 MW power (start-up / peak load), 3 MW regular operations | Power load test | Non-availability of utilities delays commissioning |
| SCADA / Safety & Control Systems | Fully integrated control and emergency systems (fire, gas, ESD) | Functional testing of DCS / SCADA; Alarm & interlock response tests | Non-functional interlocks or alarms are critical non-compliance |
| Environmental Compliance | Emission, noise, effluent levels as per CPCB/GPCB norms | Stack emission monitoring; Water discharge analysis; Noise level test | Non-compliance will delay COD; must be cleared by certified third party |
| Integrated Plant Performance | Overall plant output: minimum 43 MTPD; minimum 90% uptime during test run | 72-hour Performance Guarantee Test (PGT); Plant uptime and output records | Damages to be imposed for any shortfall from committed performance |

<u>Comprehensive Scope of Work of Contractor during Project Execution</u>

1. Fuel Preparation System
   - Receiver Hopper: Design and installation for feedstock intake.
   - Front Loading Tractor: To transport biomass to the preparation area.
   - Biomass Shredder: For size reduction of feedstock.
   - All Transfer Conveyors (with VFD): For efficient biomass handling and movement.
   - Fuel Feeder System: For feeding biomass to the gasifier.
2. Gasifier System: Core system for biomass-to-syngas conversion.
   - Safety, Internal Valves & Piping: For safe operation of the system.
   - Mezzanine Structures and Supports: Required for structural support of the system.
   - Ash / Slag Removal System: System for handling byproducts.
   - Primary Syngas Cleaning System: To remove impurities from syngas.
   - Waste Heat Recovery Steam Generator: To optimize energy efficiency.
   - Air blower: For start-up and shut down.
   - Since the proposal is based on in-house design along with BARC technology licence, any licensing costs are not applicable, however if DPA decides to go with any other technology licensor for the complete (or certain part(s) of) project, respective technology licensing fees will be recovered by DPA in actual.
3. Syngas Conditioning and Compression
   - Wet Scrubber: For initial syngas cleaning.
   - Syngas Polishing: Further purification of syngas.

- Syngas Compressor: To achieve the desired pressure for methanol synthesis.

4. WGSR and Carbon Capture
   - LT and HT Shift Reactors: For adjusting syngas composition.
   - Amine Scrubber: To capture $CO_2$ and other impurities.
   - Amine Regenerator: For regenerating the $CO_2$ capture system.
   - Heat exchangers and related systems for temperature management.
   - Catalysts: all shift reaction catalysts, amine solutions and other consumables
5. Electrical, Instrumentation, and Control Package
   - Transformer: For main power supply.
   - Local Control Panel and MCC panels: For operation and monitoring.
   - Field Wiring: For power and control systems.
   - Gas Analysers and CEMS: For emission monitoring.
   - Automation and control system: complete process automation and control using PLC and SCADA.
6. Electromechanical Systems
   - Motors, pumps, drives, and all mechanical and electromechanical systems installation needed for process flows.
7. Safety Valves and Control Systems
   - Safety relief valves, emergency shutdown systems, and automatic control systems.
8. Methanol Synthesis
   - Methanol Synthesis Reactor Loop: For the chemical reaction converting syngas to methanol.
   - Methanol Distillation Section: For purification and concentration.
   - Raw Methanol Tank and Stabilizer Column: For storage and stabilization of the product.
   - Catalysts for Methanol Synthesis: Required for the reaction.
9. Utilities
   - $O_2$ and $N_2$ Gas Plants: For required industrial gases.
   - Cooling Tower, Chillers, Air Compressors: For thermal regulation and process cooling.
   - Firefighting System, CCTV, and Security: For safety and security protocols.
10. Civil Works
    - Foundations, RCC, Structural Support: Required for all systems.
    - Control Room Building: Office and operations area.
    - Storage and Other Structures: For equipment, raw materials, and finished products.
    - Exclusions: Non-essential buildings or structures not critical to plant operations.
11. Statutory Approvals
    - All required documentation and submission for approvals.
    - Exclusions: Legal consultancy or support beyond standard submission. All govt fees, guarantees, deposits, etc.
12. Certification under the EU RED II Directives
    - All required documentation and submission for approvals.

- **Co-ordinating with the concerned national and international agencies for respective approvals and certifications**
- **Exclusions: Legal consultancy or support beyond standard submission. All govt fees, guarantees, deposits, etc. to be paid to the govt agencies in India or EU.**

13. **Methanol Storage and Transfer Infrastructure**
**Exclusions:**
    - **Bio-Methanol Storage Terminal: With bunding and foam protection.**
    - **Marine Fuel Dispensing Station: For bunkering ships.**
    - **Fuel Transfer Pumps, Loading Arms, and Mass Flow Meters: For safe**

**Responsibility Matrix:**

| | |
|---|---|
| | *In scope of Contractor* |
| | *In scope of DPA* |

| Sr. | Project Component | Basic and Detailed Engineering | Procurement / Fabrication and Supply | Supervision, Installation and Commissioning | Erection, Civil Work and Misc. |
|---|---|---|---|---|---|
| 1 | Fuel Preparation System | | | | |
| 1.1 | Receiver hopper | | | | |
| 1.2 | Front loading tractor | | | | |
| 1.3 | Biomass shredder | | | | |
| 1.4 | All transfer conveyor (with VFD) | | | | |
| 2 | Gasification Island | | | | |
| 2.1 | Fuel Feeder System | | | | |
| 2.2 | Gasifier System | | | | |
| 2.3 | Safety, internal valves & piping | | | | |
| 2.4 | Mezzanine structures and supports | | | | |
| 2.5 | Ash/Slag Removal System | | | | |
| 2.6 | Primary Syngas cleaning system | | | | |
| 2.7 | Waste heat recovery steam generator | | | | |
| 3 | Syngas conditioning and compression | | | | |
| 3.1 | Wet Scrubber | | | | |
| 3.2 | Syngas polishing | | | | |
| 3.3 | Syngas compressor | | | | |
| 4 | WGSR and carbon capture | | | | |
| 4.1 | LT Shift reactor | | | | |
| 4.2 | HT Shift reactor | | | | |
| 4.3 | LT shift cooler | | | | |
| 4.4 | HT shift cooler | | | | |
| 4.5 | Amine Scrubber | | | | |
| 4.6 | Amine Regenerator | | | | |
| 4.7 | Amine Regen Condenser | | | | |
| 4.8 | Amine Regen Reboiler | | | | |
| 4.9 | Amine Regen Feed Preheater | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 4.10 | Amine Regen Cooler | | | | |
| 5 | Electrical, Instrumentation and Control Package | | | | |
| 5.1 | Transformer from main power supply station | | | | |
| 5.2 | Local Control Panel | | | | |
| 5.3 | PCC, MCC panels | | | | |
| 5.4 | Individual package panels | | | | |
| 5.5 | Central PLC, Scada Panel and HMI | | | | |
| 5.6 | Power supply and distribution panel | | | | |
| 5.7 | Plant control and instrumentation | | | | |
| 5.8 | Field Wiring (Power & Control) | | | | |
| 5.9 | All sensors, meters, gauge and other diagnostics | | | | |
| 5.10 | Gas analysers, impurity detectors, CEMS | | | | |
| 6 | Electromechanical systems | | | | |
| 7 | Safety valves and control systems | | | | |
| 8 | All piping and flow control systems | | | | |
| 9 | Chimney/Stack Exhaust | | | | |
| 10 | Methanol synthesis | | | | |
| 10.1 | Methanol synthesis reactor loop | | | | |
| 10.2 | Methanol distillation section | | | | |
| 10.3 | Raw methanol tank | | | | |
| 10.4 | Stabilizer column | | | | |
| 10.5 | LP methanol column | | | | |
| 10.6 | MP methanol column | | | | |
| 10.7 | Catalyst used for Methanol synthesis | | | | |
| 10.8 | Vent gas scrubber | | | | |
| 11 | Utilities | | | | |
| 11.1 | O2 and N2 gas plant | | | | |
| 11.2 | Cooling tower | | | | |
| 11.3 | Chillers plant | | | | |
| 11.4 | Air compressors | | | | |
| 11.5 | Firefighting system | | | | |
| 11.6 | CCTV and security | | | | |
| 11.7 | Flaring system | | | | |
| 11.8 | Effluent Treatment Plant | | | | |
| 12 | Civil Works | | | | |
| 12.1 | Foundation, RCC, and structural support | | | | |
| 12.2 | Control Room Building | | | | |
| 12.3 | Sheds, storage and other structure | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 13 | Piping and Wiring for utilities from DPA Kandla source point | | | | |
| 14 | Water, effluent and DM Water storage | | | | |
| 15 | Laboratory including equipment | | | | |
| 16 | Statutory Approvals | | | | |
| 16.1 | All details, drawings and documents | | | | |
| 16.2 | Application for all statutory compliances | | | | |
| 17 | Certification under the EU RED II Directives | | | | |
| 18 | Methanol Storage and Transfer Infrastructure | | | | |
| 18.1 | Bio-Methanol Storage Terminal with bunding and foam protection | | | | |
| 18.2 | Marine Fuel Dispensing Station (for bunkering ships) | | | | |
| 18.3 | Fuel Transfer Pumps and Loading Arms | | | | |
| 18.4 | Loading gantry with mass flow meters | | | | |
| 18.5 | Safety instrumentation for terminal | | | | |

Timelines:

| Project Activity | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Agreement, WO, kick-off | | | | | | | | | | | | |
| Basic Engineering | | | | | | | | | | | | |
| Detailed Engineering | | | | | | | | | | | | |
| All statutory approvals | | | | | | | | | | | | |
| Procurement of Compressors | | | | | | | | | | | | |
| Procurement of Utilities | | | | | | | | | | | | |
| Fabrication of Process Equipment | | | | | | | | | | | | |
| Procurement of EIC | | | | | | | | | | | | |
| Civil and Structural Works | | | | | | | | | | | | |
| Supply on Site | | | | | | | | | | | | |
| Erection, Assembly and Integration | | | | | | | | | | | | |
| Testing and Commissioning | | | | | | | | | | | | |
| Functionality Testing | | | | | | | | | | | | |

*EIC: Electrical, Instrumentation and Control System*

Scope of work for comprehensive operations and maintenance

| S. No. | Functional Area | Scope of Work Description |
|---|---|---|
| 1 | Supply of Biomass Raw | Sourcing, procurement, and timely supply of biomass feedstock (agro-residues, segregated organic waste) |

| | | |
|---|---|---|
| | Material | Ensuring consistent quality (moisture content, calorific value) and quantity as per plant load |
| 2 | Feedstock Handling | Receipt, unloading, and storage of municipal solid waste / biomass |
| | | Shredding, drying, and homogenization |
| | | Regular cleaning and maintenance of handling systems |
| 3 | Plant Operations | Continuous operation of plant including start up / shut down, regular maintenance as per the O&M guidelines |
| | | Monitoring gas quality (temperature, tar content, CV), methanol quality and other critical parameters |
| | | Slag / ash removal and disposal |
| | | Replacement of consumables and catalysts |
| | | Routine calibration of analysers and other instruments |
| | | LT/HT systems preventive maintenance |
| 4 | Fire Safety, Emergency Systems | Maintenance of fire detection, alarm, and suppression systems |
| | | Firewater pumps and hydrant checks |
| | | Conducting periodic mock drills |
| 5 | Preventive & Predictive Maintenance | Development and execution of preventive maintenance schedule |
| | | Vibration analysis, thermography, and oil analysis |
| | | Lubrication and spare management |
| 6 | Manpower Deployment | Skilled and semiskilled manpower deployment for 24x7 shifts |
| | | On-call specialists for automation and electrical systems |
| | | Maintenance and housekeeping teams |
| 7 | Compliance & Safety Monitoring | Environmental compliance (CPCB/SPCB) |
| | | Stack emissions, ambient air, and noise level monitoring |
| | | Supply chain transparency and compliance as per RED II Directive |
| | | PPE usage, safety permits, and incident reporting |
| 8 | Documentation & Record Keeping | Daily logbooks, shift reports, SOPs |
| | | Maintenance logs, equipment history sheets |
| | | Regulatory and audit documentation |
| 9 | Performance Monitoring & MIS | Monitoring KPIs (plant availability, methanol yield, waste conversion ratio) |
| | | Daily / weekly / monthly MIS reports |
| | | Inventory and spares tracking |
| 10 | Training & Skill Development | Periodic training on SOPs, safety, emergency handling |
| | | Technical upskilling sessions for plant staff |
| | | Safety drills and refresher programs |

**Exclusions:**

1. Any compliance reporting to state, national and EU authorities. Although Contractor shall provide all necessary details and documents for the same
2. Any capacity enhancement in the existing infrastructure, including upgradation of technology
3. Cost of all utilities, including power and water.
4. Any replacement cost of equipment beyond the guarantee period of the respective operations and maintenance.
5. Any other item / activity not explicitly mentioned in the above scope of work.

**General Terms**

1. Project Implementation Roadmap

Contractor shall undertake the execution of the project with a structured and well-defined project implementation roadmap designed to ensure timely, safe, and quality delivery in alignment with global best practices.

Project Management and Team Formation

- Contractor will constitute a dedicated Project Implementation Team (PIT) for this project, which shall include professionals from disciplines including engineering, procurement, quality assurance, health & safety, and project controls.
- A Designated Project Manager (PM) shall be appointed as the single point of contact between Contractor and DPA.
- The Project Manager shall be responsible for:
  - Coordination with DPA and all relevant stakeholders,
  - Day-to-day planning and management of project activities,
  - Ensuring adherence to project timelines, cost, and quality,
  - Regular reporting and review meetings.

International Workflow Processes / Quality / Engineering Procedures

- Contractor shall follow structured workflow and engineering procedures in accordance with industry best practices and applicable API, ASME, ASTM, ISO standards.
- All engineering drawings and documentation shall undergo a multi-stage review and approval cycle involving internal checks and client validations.
- Procurement and fabrication will be executed under stringent quality control measures, with traceability and certifications maintained for all critical components.
- Workflow will include the following key stages:
  1. Engineering & Design Finalization
  2. Procurement & Vendor Qualification
  3. Fabrication & Assembly
  4. Testing (FAT / NDT / Hydro / Performance)
  5. Site Delivery & Installation
  6. Commissioning and Handover

2. Project Kick-off Meeting

The Project Kick-off Meeting shall be convened within 7 days from Zero Date (defined below) and will be held at a mutually agreed location or virtually.

Participants:

- Project Implementation Team of Contractor
- DPA Officials
- Representatives from key vendors and subcontractors, licensors (if any)

Agenda and Deliverables:

- Review and approval of detailed project execution plan,
- Finalization of communication protocols and escalation matrix,
- Confirmation of engineering documentation and approval timelines,
- HSE (Health, Safety, Environment) plan validation,
- Approval of quality assurance / control protocols,
- Identification of all required permits, clearances, and dependencies,
- Establishment of reporting formats and frequency,

- Locking in of delivery schedules and milestone timelines,
- Agreement on billing and payment milestone schedules.

3. Quality Assurance Plan (QAP)
   - Contractor shall adhere to a comprehensive Quality Assurance Plan, consistent with global practices in the oil and gas industry.

   Key Components:
   - Material Traceability: All input materials shall be traceable to certified mills and undergo verification as per design specifications.
   - Welding and Fabrication: Performed by qualified personnel following WPS (Welding Procedure Specification) and PQR (Procedure Qualification Record) standards.
   - Inspection and Testing:
     - Incoming material inspection
     - In-process quality control
     - Final inspections
     - Third-party inspections (at cost of DPA)
   - Documentation and Records:
     - Inspection Test Plans (ITPs)
     - Material Test Certificates (MTCs)
     - As-built drawings
     - Final dossier submission

4. Zero Date
   The Zero Date shall be defined as the date conveyed as 'Work Commencement Date' through Work Order. All timelines and deliverables shall be tracked from this date.

5. Commercial Operation Date (COD)
   The Commercial Operation Date (COD) shall be the date on which the project is successfully commissioned and officially handed over to DPA, after all functional tests and documentation requirements are met. A formal Project Completion Certificate shall be signed by both parties on this date.

6. Warranty
   Contractor shall provide a warranty period of Five (5) Years for completed system of this project.

   Warranty Terms:
   - The warranty shall cover any manufacturing defects, design flaws, or material failures under normal operating conditions.
   - Contractor shall be responsible for repair or replacement of defective equipment at no cost to DPA during the warranty period.
   - The warranty period shall commence from the COD.
   - Contractor may offer an extension of warranty beyond 5 years on mutually agreed commercial terms.

7. Defect Liability Period of one year will be applicable after completion of Operation & Comprehensive maintenance of Five years.

8. Liquidated damages

In case of delay in completion of the contract, liquidated damages (L.D) may be levied at the rate of ½ % of the contract value per week of delay or part thereof, subject to a maximum of 10 per cent of the contract price.

(i) The owner, if satisfied, that the works can be completed by the contractor within a reasonable time after the specified time for completion, may allow further extension of time at its discretion with or without the levy of L.D. In the event of extension of time at its discretion with L.D, the owner will be entitled without prejudice to any other right or remedy available in that behalf per cent (1/2%) of the contract value of the works for each week or part of the week subject to the ceiling defined in above sub-clause.

(ii) The owner, if not satisfied that the works can be completed by the contractor, and in the event of failure on the part of the contractor to complete work with in further extension of time allowed as aforesaid, shall be entitled, without prejudice to any other right, or remedy available in that behalf, to rescind the contract.

(iii) The owner, if not satisfied with the progress of the contract and in the event of failure of the contractor to recoup the delays in the mutually agreed time frame, shall be entitled to terminate the contract.

(iv) In the event of such termination of the contract as described in clauses (ii) or (iii) or both the owner shall be entitled to recover L.D. up to ten per cent (10%) of the contract value and forfeit the security deposit made by the contractor besides getting the work completed by other means at the risk and cost of the contractor.

(v) The ceiling of LD shall be 10% of the cost of work.

(vi) In case part / portions of the work can be commissioned and port operates the portion for commercial purpose, the rate of LD will be restricted to the uncompleted value of work, the maximum LD being on the entire contract value.

Note: Contract price for LD shall be inclusive of tender price plus taxes and duties.

9. Performance Securities

Performance guarantee should be 10% of Contract price of which 5% of contract price should be submitted as Bank Guarantee / FDR for the entire amount from any Nationalized / Scheduled Bank (Except Co-operative Banks) Banks having its branch at Gandhidham, or online digital mode of payment within 21 days on receipt of letter of Acceptance / Intent and balance 5% recovered as Retention Money from Running Bills. Recovery of 5% Retention Money to commence from the first RA bill onwards @ 5% of the Bill Value from each bill. Retention Money will be released within 14 days from the date of payment of Final bill. The BG should remain valid for a period of 60 (sixty) days beyond the date of

completion of all contractual obligations of the concerned contractor, including Defect Liability Period.

Balance PG will be refunded after successfully completion of defect liability. Failure of the Successful Bidder to comply with the requirements as mentioned above shall constitute sufficient grounds for cancellation of the award of work and forfeiture of bid security.

Successful Bidder has to submit the Performance Security @ 5% of Contract Price within 21 days of receipt of Letter of Acceptance / Intent, failing which the work will not be awarded.
The documentary evidence (copy of paid challan in Government Treasury) of welfare cess @1% of work done as amended by Statutory Authority from time to time paid on final bill shall be submitted before releasing the Performance Guarantee.

10. Applicable standards, codes, and benchmarks to be followed for the methanol production project

1. Plant and Machinery Standards:

| Area | Standard / Code | Description |
|---|---|---|
| Gasifier Design | IS 15549 / ASTM D7582 | Standards for biomass gasifier systems, performance, and safety parameters |
| Feedstock Handling | IS 11592 / ISO 28221 | Conveyor design and material handling safety standards |
| Reactors (Gasification, Reforming) | ASME Section VIII Div 1 | Pressure vessel design code for high-pressure operations |
| Synthesis Loop Equipment | API 661 / API 617 | Standards for heat exchangers and centrifugal compressors |
| Methanol Synthesis Reactor | ASME / IEC 61508 | High-pressure catalytic reactors with safety-integrated systems |
| Emission Control Units | CPCB Norms / ISO 14001 | Emission compliance and environmental management system |
| Storage Tanks | IS 803 / API 650 | Construction standards for methanol and syngas storage tanks |
| Instrumentation & Controls | IEC 61511 / ISA S88 | Process control and safety instrumented system standards |
| Fire and Safety | NFPA 30 / IS 15667 | Safe storage and handling of flammable liquids like methanol |

2. Operational Standards:

| Area | Standard / Code | Description |
|---|---|---|
| Plant Safety and HAZOP | IS 14489 / ISO 45001 | Occupational safety management and hazard identification |

| | | |
|---|---|---|
| Process Automation | ISA-88 / IEC 61512 | Batch process automation standards |
| Waste Handling | SWM Rules 2016 / CPCB Guidelines | Collection, segregation, and preparation of waste feedstock |
| Water and Effluent Management | IS 10500 / E(P) Rules | Industrial water quality and effluent discharge norms |
| Energy Management | ISO 50001 | Guidelines for energy efficiency and optimization |
| Maintenance Practices | ISO 14224 / TPM Guidelines | Preventive maintenance and reliability-centered operations |

3. Methanol Product Quality Standards:

| Parameter | Standard / Code | Limit / Specification |
|---|---|---|
| Purity | IS 517 / ASTM D1152 | ≥ 99.85% by weight |
| Specific Gravity | IS 517 | 0.791–0.793 at 20°C |
| Acidity (as Acetic Acid) | IS 517 | ≤ 0.003% |
| Water Content | ASTM D1364 | ≤ 0.1% |
| Residue on Evaporation | ASTM D1353 | ≤ 0.001% |
| Appearance | Visual / IS 517 | Clear, free from suspended matter |
| Odor | IS 517 | Characteristic alcoholic odour |
| EU Fuel | Standard | |

4. Quality Control and Assurance:

| Area | Standard / Code | Description |
|---|---|---|
| Sampling Procedures | ASTM D4057 / IS 1448 | Standard practices for sampling of liquids |
| Laboratory Testing | ISO 17025 / NABL Guidelines | Accredited testing labs for calibration and analytical validation |
| Batch Traceability | ISO 9001 / ERP Integration | Full lifecycle tracking of product from input to dispatch |
| Safety Data Sheets (SDS) | GHS / REACH Regulations | Safety, toxicity, and handling information for methanol |
| Internal Quality Audits | ISO 19011 | Internal auditing of quality control systems |
| Blending/Packaging Checks | OIML R117 | Legal metrology for liquid chemical measurements and filling |

*-sd-*
Chief Mechanical Engineer
Deendayal Port Authority

Sign. & Seal of Contractor

Annexure

## Submission to be made with Expression of Interest

### Credentials of Firm

| Sr. | Description | Inputs to be filled in |
|---|---|---|
| 1. | Name of Firm | |
| 2. | GST No. | |
| 3. | Whether Similar Work i.e. *Design, Supply, Testing & Commissioning of Bio Methanol Production Plant* has been executed?<br>If Yes, please provide the details of<br>(a) capacity,<br>(b) location and<br>(c) employer of referred plant. | |
| 4. | Please share the copy of Work Order / Completion Certificate of referred plant. | |

### Budgetary Offer

| Sr. | Description | Unit | Qty. | Rate | Amount for the Qty. | |
|---|---|---|---|---|---|---|
| | | | | | in figures | in words |
| 1 | Biomass Handling System | Lot | 1 | | | |
| 2 | Gasification Island | Lot | 1 | | | |
| 3 | Balance of system | Lot | 1 | | | |
| 4 | Syngas Compressor | Lot | 1 | | | |
| 5 | O2 and all other utilities | Lot | 1 | | | |
| 6 | MeOH Block | Lot | 1 | | | |
| 7 | All Catalysts and solutions | Lot | 1 | | | |
| 8 | MeOH storage and safety | Lot | 1 | | | |
| 9 | Laboratory Equipment | Lot | 1 | | | |
| 10 | Civil foundations, boundary, buildings and all material | Lot | 1 | | | |
| 11 | All EU, state and local approvals | Lot | 1 | | | |
| 12 | Operation | | | | | |
| a | 1st Year cost of Operation | Month | 12 | | | |
| b | 2nd Year cost of Operation | Month | 12 | | | |
| c | 3rd Year cost of Operation | Month | 12 | | | |
| d | 4th Year cost of Operation | Month | 12 | | | |
| e | 5th Year cost of Operation | Month | 12 | | | |
| 13 | Comprehensive Maintenance | | | | | |
| a | 1st Year cost of Comprehensive Maintenance | Month | 12 | | | |
| b | 2nd Year cost of Operation Comprehensive Maintenance | Month | 12 | | | |
| c | 3rd Year cost of Operation Comprehensive Maintenance | Month | 12 | | | |
| d | 4th Year cost of Operation Comprehensive Maintenance | Month | 12 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| e | 5th Year cost of Operation Comprehensive Maintenance | Month | 12 | | | |

(Total Rupees _____Only)

GST Charges shall be extra.

Payment Terms

All payments will be made through RTGS.

(1) For items at Sr. No. 1 to 10:
   (a) On receipt of material at DPA site:
   Seventy percent (70 %) of the item rate mentioned in Budgetary Offer shall be paid after receipt of the same at DPA site in good condition and after certification by Nodal Officer & TPIA.
   (b) Installation, Testing & commissioning:
   Twenty percent (20 %) of the item rate mentioned in Budgetary Offer shall be paid against installation, testing and commissioning of the equipment after certification by Nodal Officer & TPIA.
   (c) Upon final taking over:
   Ten percent (10 %) of the item rate mentioned in Budgetary Offer shall be paid upon certification of Nodal Officer & TPIA and acceptance & final taking over of the Complete plant by the DPA.
(2) For item at Sr. No. 11: 100 % payment will be released on all EU, state and local approvals.
(3) Payment for Sr. No. 12 & 13 will be on monthly basis.

*-sd-*
Chief Mechanical Engineer
Deendayal Port Authority

Sign. & Seal of Contractor

Place: _____

Date: _____